



hereditary neuralgic amyotrophy

Hereditary neuralgic amyotrophy is a disorder characterized by episodes of severe pain and muscle wasting (amyotrophy) in one or both shoulders and arms. Neuralgic pain is felt along the path of one or more nerves and often has no obvious physical cause. The network of nerves involved in hereditary neuralgic amyotrophy, called the brachial plexus, controls movement and sensation in the shoulders and arms.

People with hereditary neuralgic amyotrophy usually begin experiencing attacks in their twenties, but episodes have occurred as early as the age of 1 year in some individuals. The attacks may be spontaneous or triggered by stress such as strenuous exercise, childbirth, surgery, exposure to cold, infections, immunizations, or emotional disturbance. While the frequency of the episodes tends to decrease with age, affected individuals are often left with residual problems, such as chronic pain and impaired movement, that accumulate over time.

Typically an attack begins with severe pain on one or both sides of the body; right-sided involvement is most common. The pain may be difficult to control with medication and usually lasts about a month. Within a period of time ranging from a few hours to a couple of weeks, the muscles in the affected area begin to weaken and waste away (atrophy), and movement becomes difficult. Muscle wasting may cause changes in posture or in the appearance of the shoulder, back, and arm. In particular, weak shoulder muscles tend to make the shoulder blades (scapulae) "stick out" from the back, a common sign known as scapular winging. Additional features of hereditary neuralgic amyotrophy may include decreased sensation (hypoesthesia) and abnormal sensations in the skin such as numbness or tingling (paresthesias). Areas other than the shoulder and arm may also be involved.

In a few affected families, individuals with hereditary neuralgic amyotrophy also have unusual physical characteristics including short stature, excess skin folds on the neck and arms, an opening in the roof of the mouth (cleft palate), a split in the soft flap of tissue that hangs from the back of the mouth (bifid uvula), and partially webbed or fused fingers or toes (partial syndactyly). They may also have distinctive facial features including eyes set close together (ocular hypotelorism), a narrow opening of the eyelids (short palpebral fissures) with a skin fold covering the inner corner of the eye (epicanthal fold), a long nasal bridge, a narrow mouth, and differences between one side of the face and the other (facial asymmetry).

Frequency

Hereditary neuralgic amyotrophy is a rare disorder, but its specific prevalence is unknown. Approximately 200 families affected by the disorder have been identified worldwide.

Genetic Changes

Mutations in the *SEPT9* gene cause hereditary neuralgic amyotrophy. The *SEPT9* gene provides instructions for making a protein called septin-9, which is part of a group of proteins called septins. Septins are involved in a process called cytokinesis, which is the step in cell division when the fluid inside the cell (cytoplasm) divides to form two separate cells.

The *SEPT9* gene seems to be turned on (active) in cells throughout the body. Approximately 15 slightly different versions (isoforms) of the septin-9 protein may be produced from this gene. Some types of cells make certain isoforms, while other cell types produce other isoforms. However, the specific distribution of these isoforms in the body's tissues is not well understood. Septin-9 isoforms interact with other septin proteins to perform some of their functions.

Mutations in the *SEPT9* gene may change the sequence of protein building blocks (amino acids) in certain septin-9 isoforms in ways that interfere with their function. These mutations may also change the distribution of septin-9 isoforms and their interactions with other septin proteins in some of the body's tissues. This change in the functioning of septin proteins seems to particularly affect the brachial plexus, but the reason for this is unknown.

Because many of the triggers for hereditary neuralgic amyotrophy also affect the immune system, researchers believe that an autoimmune reaction may be involved in this disorder. However, the relation between *SEPT9* mutations and immune function is unclear. Autoimmune disorders occur when the immune system malfunctions and attacks the body's own tissues and organs. An autoimmune attack on the nerves in the brachial plexus likely results in the signs and symptoms of hereditary neuralgic amyotrophy.

At least 15 percent of families affected by hereditary neuralgic amyotrophy do not have *SEPT9* gene mutations. In these cases, the disorder is believed to be caused by mutations in a gene that has not been identified.

Inheritance Pattern

This condition is inherited in an autosomal dominant pattern, which means one copy of the altered gene in each cell is sufficient to cause the disorder.

Other Names for This Condition

- Amyotrophic Neuralgia
- Brachial Neuralgia
- Brachial Neuritis
- Brachial Plexus Neuritis
- familial brachial plexus neuritis
- hereditary brachial plexus neuropathy
- heredofamilial neuritis with brachial plexus predilection
- HNA
- NAPB
- Neuralgic Amyotrophy
- neuritis with brachial predilection
- Shoulder Girdle Neuropathy

Diagnosis & Management

These resources address the diagnosis or management of hereditary neuralgic amyotrophy:

- GeneReview: Hereditary Neuralgic Amyotrophy
<https://www.ncbi.nlm.nih.gov/books/NBK1395>
- Genetic Testing Registry: Amyotrophy, hereditary neuralgic
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1834304/>

These resources from MedlinePlus offer information about the diagnosis and management of various health conditions:

- Diagnostic Tests
<https://medlineplus.gov/diagnostictests.html>
- Drug Therapy
<https://medlineplus.gov/drugtherapy.html>
- Surgery and Rehabilitation
<https://medlineplus.gov/surgeryandrehabilitation.html>
- Genetic Counseling
<https://medlineplus.gov/geneticcounseling.html>
- Palliative Care
<https://medlineplus.gov/palliativecare.html>

Additional Information & Resources

MedlinePlus

- Health Topic: Peripheral Nerve Disorders
<https://medlineplus.gov/peripheralnervedisorders.html>

Genetic and Rare Diseases Information Center

- Hereditary neuralgic amyotrophy
<https://rarediseases.info.nih.gov/diseases/3955/hereditary-neuralgic-amyotrophy>

Additional NIH Resources

- National Institute of Neurological Disorders and Stroke: Hereditary Neuropathies Information Page
<https://www.ninds.nih.gov/Disorders/All-Disorders/Hereditary-Neuropathies-Information-Page>
- National Institute of Neurological Disorders and Stroke: Peripheral Neuropathy Fact Sheet
<https://www.ninds.nih.gov/Disorders/All-Disorders/Peripheral-Neuropathy-Information-Page>

Educational Resources

- Disease InfoSearch: Hereditary neuralgic amyotrophy
<http://www.diseaseinfosearch.org/Hereditary+neuralgic+amyotrophy/8525>
- Dutch Neuromuscular Research Centre
http://www.isno.nl/Neuromuscular_Info/Disorders_and_diagnostics/Disorders/Items/Neuralgic_amyotrophy/Default.aspx
- JAMA Patient Page: Peripheral Neuropathy
<http://jamanetwork.com/journals/jama/fullarticle/185714>
- MalaCards: amyotrophic neuralgia
http://www.malacards.org/card/amyotrophic_neuralgia
- Orphanet: Neuralgic amyotrophy
http://www.orpha.net/consor/cgi-bin/OC_Exp.php?Lng=EN&Expert=2901
- University of Antwerp
<http://www.vib.be/en/news/Pages/Defect-in-gene-causes-%27Neuralgic-Amyotrophy%27-.aspx>

Patient Support and Advocacy Resources

- National Organization for Rare Disorders (NORD)
<https://rarediseases.org/rare-diseases/hereditary-neuralgic-amyotrophy/>
- The Foundation for Peripheral Neuropathy
<https://www.foundationforpn.org/>

GeneReviews

- Hereditary Neuralgic Amyotrophy
<https://www.ncbi.nlm.nih.gov/books/NBK1395>

Genetic Testing Registry

- Amyotrophy, hereditary neuralgic
<https://www.ncbi.nlm.nih.gov/gtr/conditions/C1834304/>

Scientific Articles on PubMed

- PubMed
<https://www.ncbi.nlm.nih.gov/pubmed?term=%28Brachial+Plexus+Neuritis%5BMAJR%5D%29+AND+%28%28hereditary+neuralgic+amyotrophy%5BTIAB%5D%29+OR+%28amyotrophic+neuralgia%5BTIAB%5D%29+OR+%28brachial+neuralgia%5BTIAB%5D%29+OR+%28brachial+neuritis%5BTIAB%5D%29+OR+%28brachial+plexus+neuritis%5BTIAB%5D%29+OR+%28hereditary+brachial+plexus+neuropathy%5BTIAB%5D%29+OR+%28neuralgic+amyotrophy%5BTIAB%5D%29+OR+%28shoulder+girdle+neuropathy%5BTIAB%5D%29+OR+%28hna%5BTIAB%5D%29+OR+%28napb%5BTIAB%5D%29%29+AND+english%5Bla%5D+AND+human%5Bmh%5D+AND+%22last+1800+days%22%5Bdp%5D>

OMIM

- AMYOTROPHY, HEREDITARY NEURALGIC
<http://omim.org/entry/162100>

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Reprinted from Genetics Home Reference:

<https://ghr.nlm.nih.gov/condition/hereditary-neuralgic-amyotrophy>

Reviewed: September 2009

Published: February 14, 2017

Lister Hill National Center for Biomedical Communications
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National Institutes of Health
Department of Health & Human Services